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A profile is presented of an elementary school in which the building design was determined by the social environment and the climate--it is located in an economically depressed section of a hot, dusty city, the population of which is mainly Spanish speaking. The school provides cool, dustless classrooms and shaded outdoor space. The description emphasizes why the school was designed as it was, and how it was designed and built. Five schematics, eight photographs, and an evaluation of the school are included. (FS)

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Profiles of Significant Schools

M O N T R O S E E L E M E N T A R Y S C H O O L

L A R E D O , T E X A S

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OFFICE OF EDUCATION

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New Ideas for School Design

Communities all over the United States are building new schools. But not every administrator, architect, and school board member can tour the country looking at the latest developments in school planning and design.

To provide people engaged in school building with a detailed knowledge of the most adventurous new schools, EFL is publishing this series of reports, entitled Profiles of Significant Schools. The reports attempt to show two things: why the school was designed as it was, and how it was designed and built. In order to do this, the Profiles will explore the educational program (which may in itself be unusual), any architectural innovations the design may contain, and any special features that may be of interest, such as air conditioning, flexibility, or open planning.

These are Profiles of individual schools, built in individual communities, to house individual programs. These schools will not necessarily serve ideally in other communities, but many of the ideas incorporated in them are applicable in many places. We hope that people involved in school planning and building will find the ideas stimulating and useful.

There will be more Profiles, but the series itself is an experiment. We would appreciate your reactions to it as well as suggestions for making future Profiles more useful.

School:	Montrose Elementary School Laredo, Texas
Grades:	1 - 6
Opened:	September, 1959
Architects:	Caudill, Rowlett & Scott Associates Texas, Oklahoma, Connecticut A. A. Leyendecker, Associate Architect
Superintendent:	J. W. Nixon
Principal:	Beatriz Rodriguez

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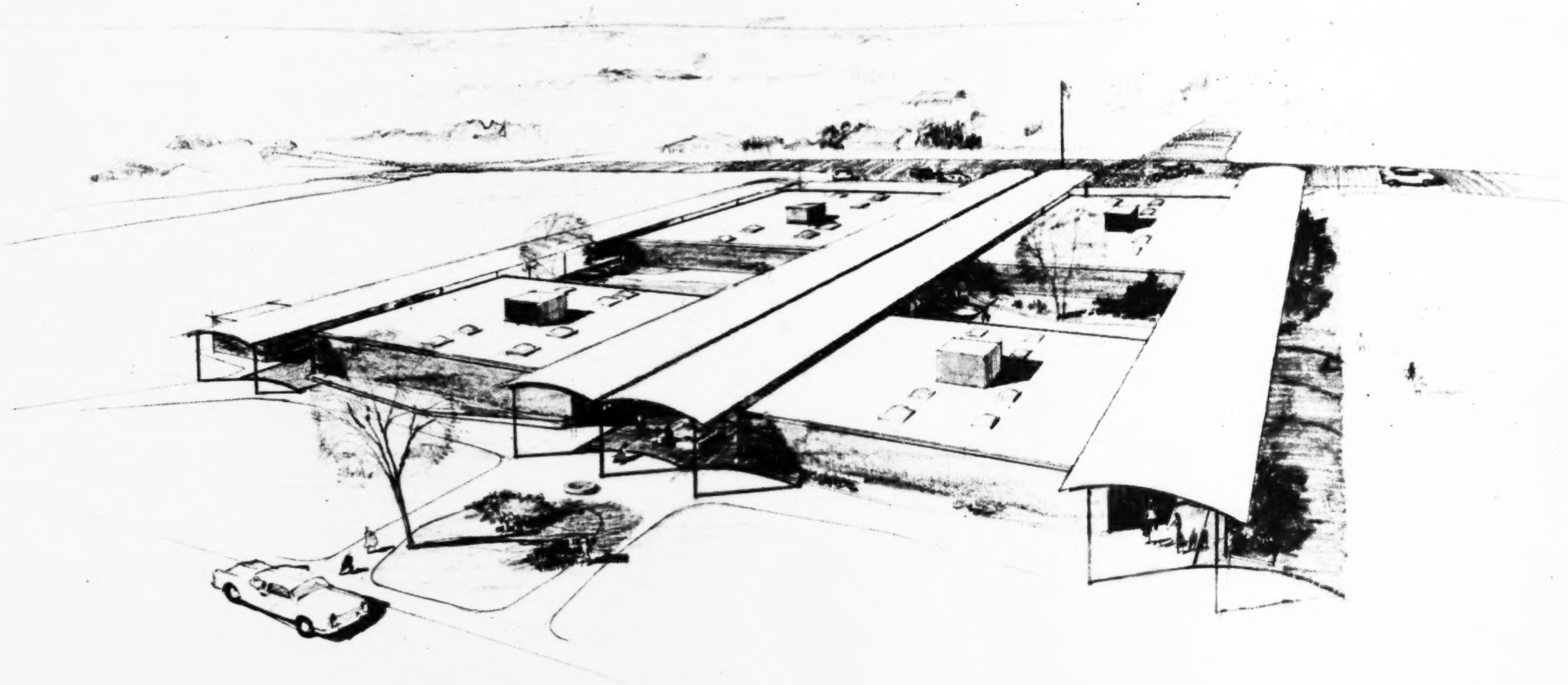


CAUDILL ROWLETT AND SCOTT ARCHITECTS

AA LEYENDECKER ASSOC. ARCHITECT

NEW MONTROSE ELEMENTARY SCHOOL LAREDO, TEXAS

The design of Montrose Elementary School in Laredo, Texas, was determined by its social environment and the climate. It is located in the middle of an economically depressed section of a hot, dusty city. The school turns its back on its surroundings and provides cool, dustless classrooms and shaded outdoor space.

The Setting

Laredo is in South Texas on the border between the United States and Mexico. The city was founded in 1755 when Texas was part of Mexico. Thus Laredo has a strong Mexican heritage, and many of its most prominent citizens are of Mexican descent.

Mexican people have continually immigrated to Laredo. Many of the recent immigrants speak little or no English. Most of them work in low paying, unskilled jobs in the city or on the outlying farms and ranches, and live largely in the city's poorer areas. Montrose is located in one of these low income sections.

The neighborhood around Montrose

The Educational Problems

Because of its location, at least 85 per cent of the children who enter Montrose Elementary School speak only Spanish. Some of these students are 14 or 15 years old, but lack of previous educational opportunity has left their educational development at the early elementary level.

During the agricultural season many of the older children drop out of school to work on farms. In the fall and spring there may be 20 students in a classroom, but in midwinter the number of students in a classroom may reach 40.

The administrators in Laredo and the teachers at Montrose were faced with the task of deciding what kind of education these children should receive, how much they can absorb, and how so many differing levels of academic skill could be arranged into a coherent school organization.

The educators have decided that one of the main jobs at Montrose is to introduce the children gradually to life in South Texas. The school program attempts to introduce the children to different standards of health, sanitation, and nutrition and stresses achieving fluency in English.

Classes are organized by age rather than intelligence or academic level. Students are never held back. Each child absorbs as much learning as his intelligence and his command of English will allow. The teachers do not attempt to force a high level of academic achievement. They have found that the children stay home if the work is too difficult. The teachers attempt to capture interest, to make education appealing, and to impart learning through much use of films, and emphasis on music, art, and dancing.

In 1957 a new Montrose school had to be built. The Laredo school authorities felt that the new building should make a positive contribution to the education of these children by expressing some of the aspects of the new cultural world into which the children were moving.

A temporary wooden section of the old Montrose School

The new Montrose School is an introduction to a different set of standards in Laredo school housing.

The Physical Problems

The planners of Montrose Elementary School wanted the building not only to contribute to the educational program, but to deal successfully with substantial problems posed by the climate.

Laredo is hot - the temperature rarely drops below 45 degrees, and on many spring and fall days it will rise to 100 degrees. (Measurable snow has fallen only three times in the past 20 years.) The soil in Laredo is composed mainly of sand, silt, and rock. Wind picks up this dry soil and spreads it over the area in the form of clogging dust.

Experience with the building of previous Laredo schools strongly suggested to both the architects and the administrators of the school system that the building should provide cool, dustless interiors and make use of Laredo's warm climate through shaded outdoor play and teaching space.

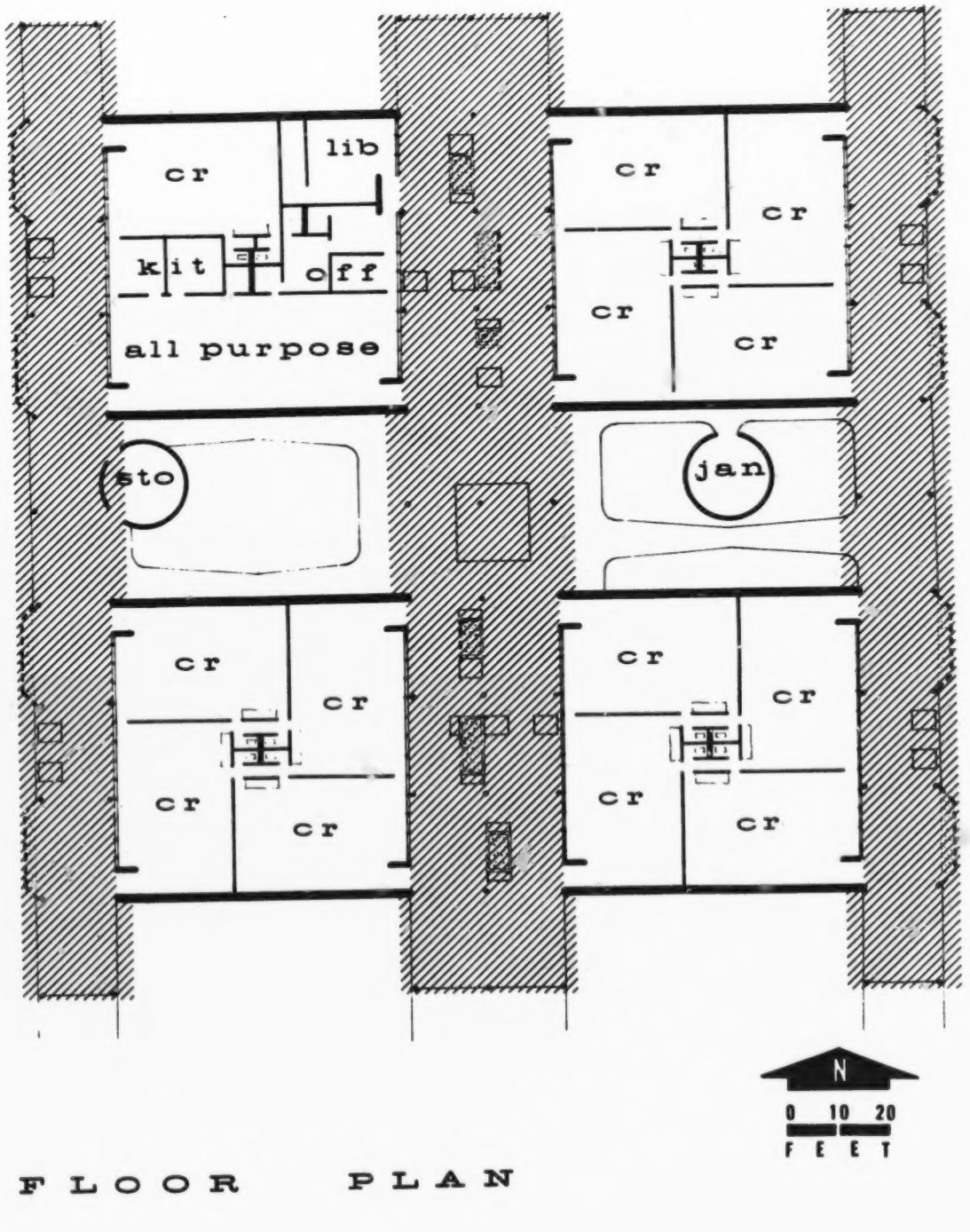
The Design Solutions

To create a more pleasant physical world for the students, the architects designed a school that turned in upon itself and shut out its surroundings.

The school is divided into four separate one-story buildings called quadruplexes which are arranged so that each classroom has direct access to shaded play or teaching space.

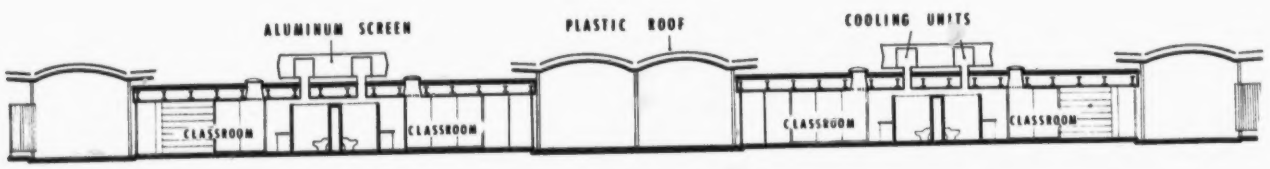
The quadruplex arrangement is designed in part to solve the problems posed by the climate. The outer shell of load-bearing brick walls and wood screens shuts out the sun and controls the view. Where glass is used glare is controlled by the wood screens, grass, trees, and specially treated non-reflective pavement.

Each quadruplex is a closed unit. To maintain a cool, dust-free atmosphere in the quadruplex, a cluster of four evaporative coolers was placed on the roof - one cooler for each of the four classrooms in the building.

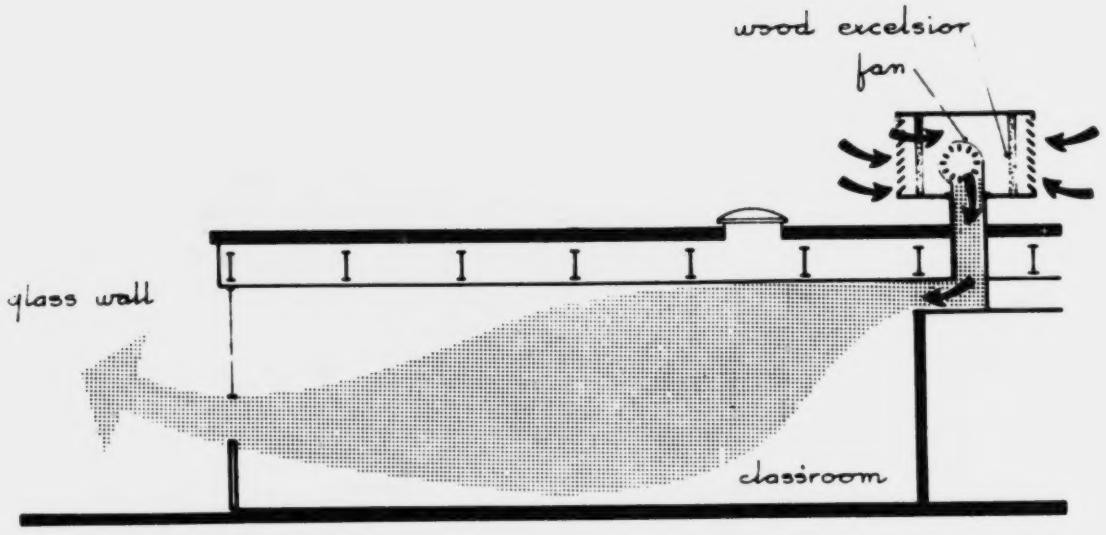


F L O O R P L A N

Cross section of school taken through classrooms.



When the children at Montrose look out of the window they see shaded interior play space.

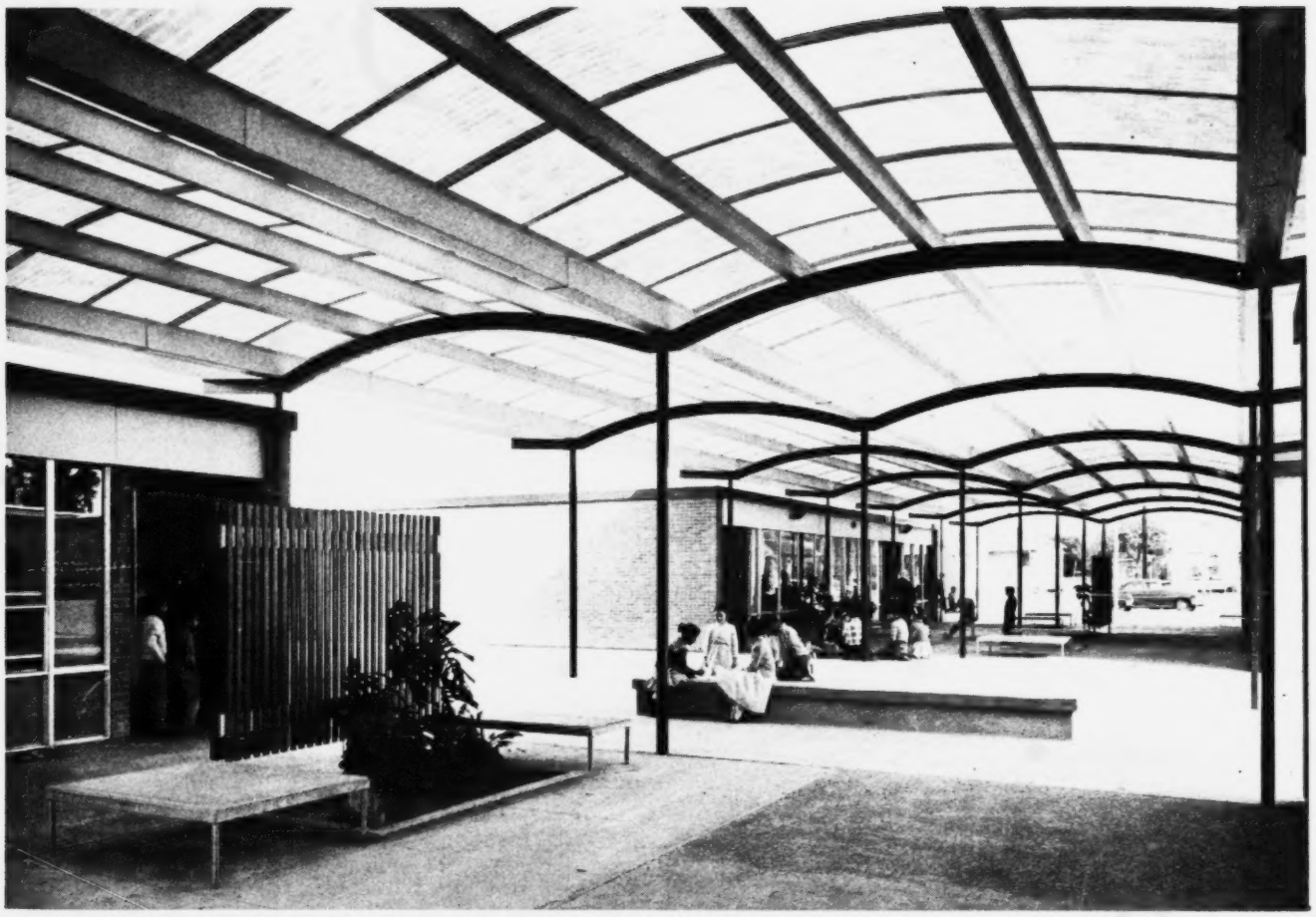


The cooler draws dust-free, cooled air into the classrooms.

These coolers have been described by the architects as "wet bales of hay sitting on the roof." The basic evaporative cooler unit is a container of absorbent wood excelsior which is kept moist with water. A fan draws outside air through the wood excelsior - where dust is filtered out and the temperature is lowered - into the classrooms. The cool, clean air forces hot air out through vents in the glass wall of the room. The cooler for each classroom is controlled by the teacher.

To shade the outdoor play and teaching space, the architects used plastic, umbrella-like canopies.

Tests of the canopy material were made in conjunction with the Texas Engineering Experiment Station at College Station, Texas. A white plastic reinforced with glass fiber, called Corrolux, which permits 20 per cent of the sunlight to pass through it was selected. The same material was used for skylight roof domes on the quadruplexes to admit light directly to the classrooms.

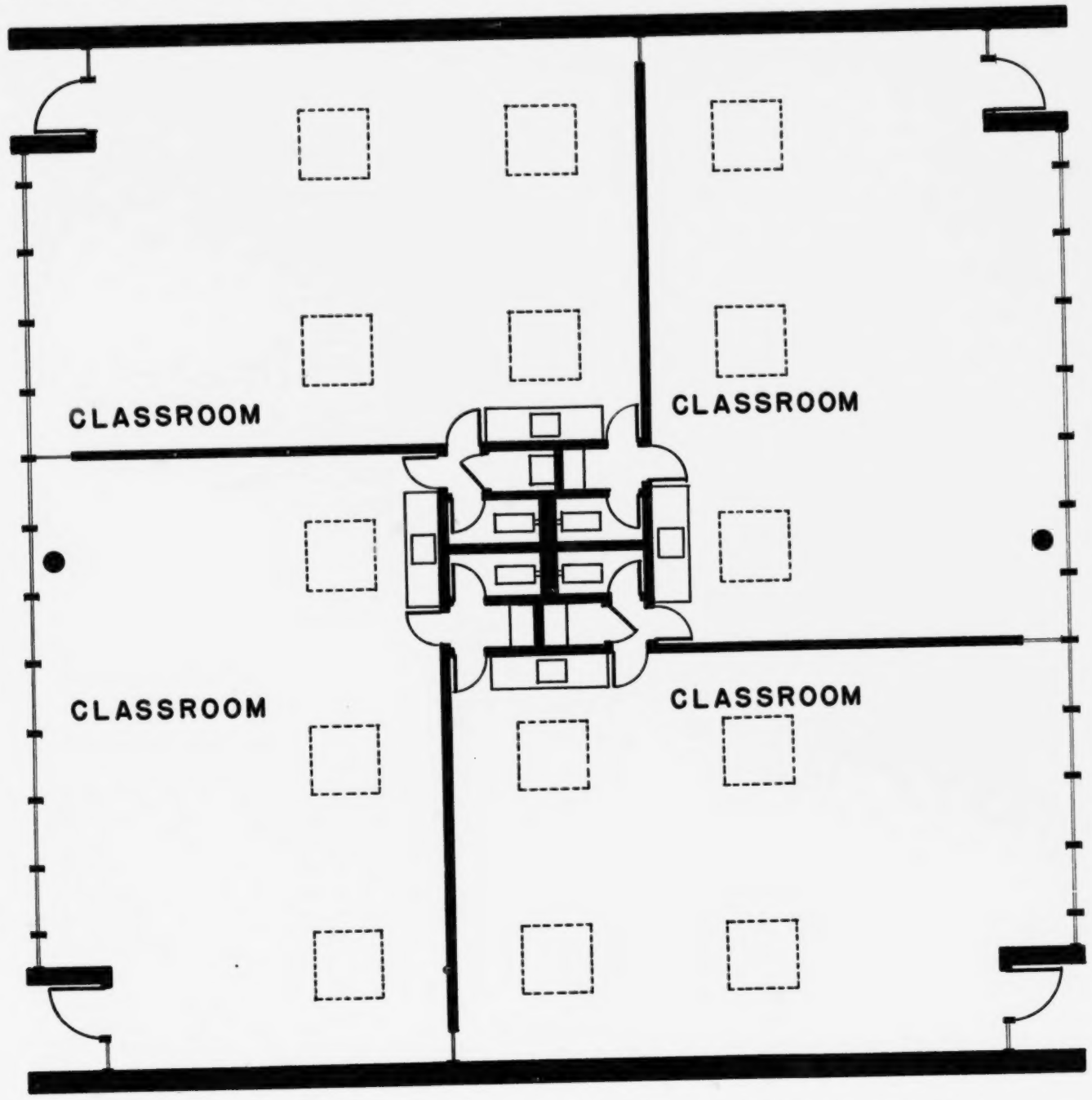


The canopies used at Montrose provide the school with partial shade and cover the outdoor court.

The courts can be used as outdoor teaching or play space, or, as in this case, a theater.

The Quadruplexes

Basically, each quadruplex consists of a roof and four exterior walls enclosing space and a central utility core. The core contains plumbing facilities and the cluster of four evaporative coolers with their ventilating fans.

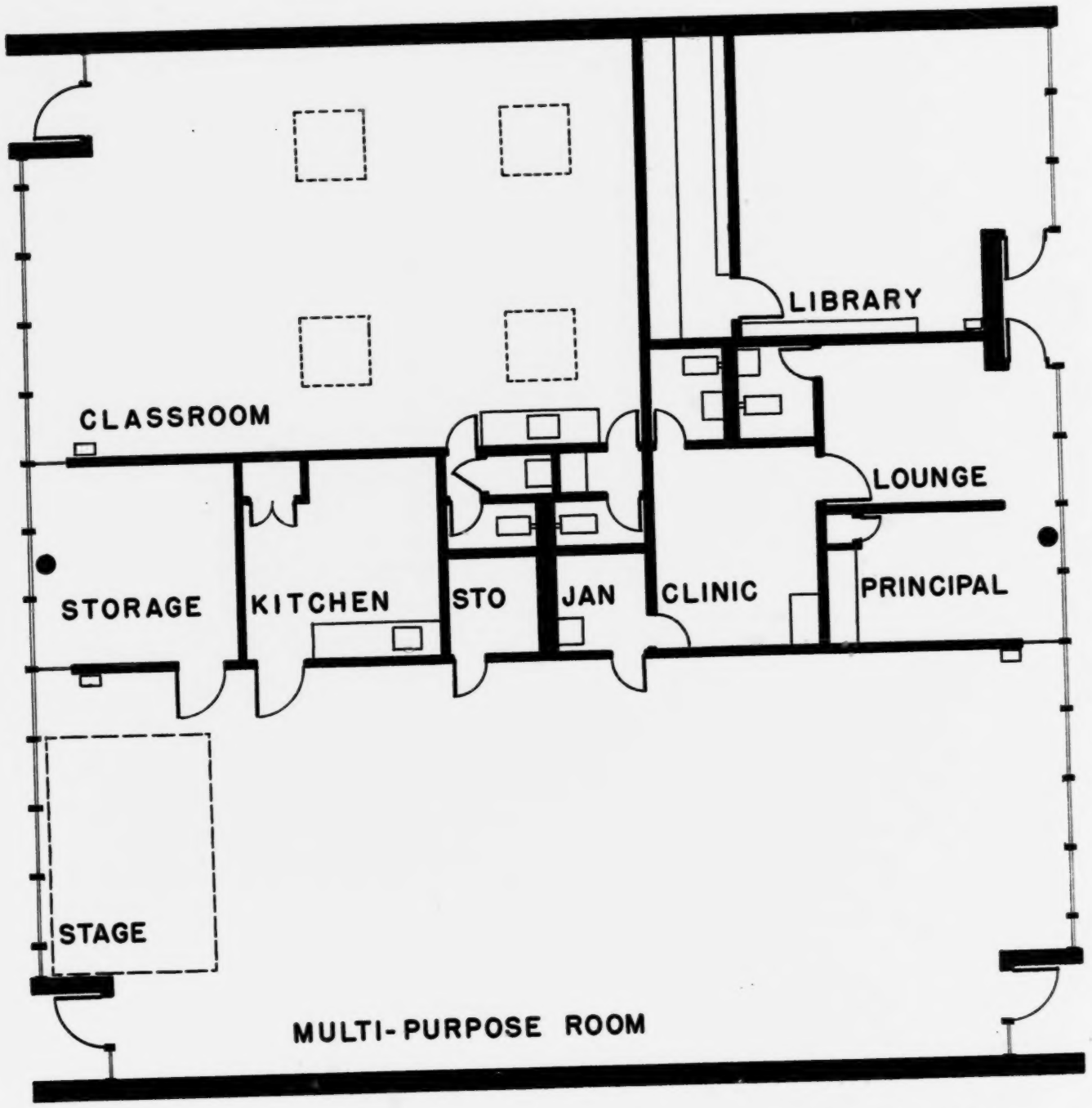


A typical academic quadruplex consists of four classrooms. The interior partitions are non-load-bearing.

Lunchtime in the all-purpose room.

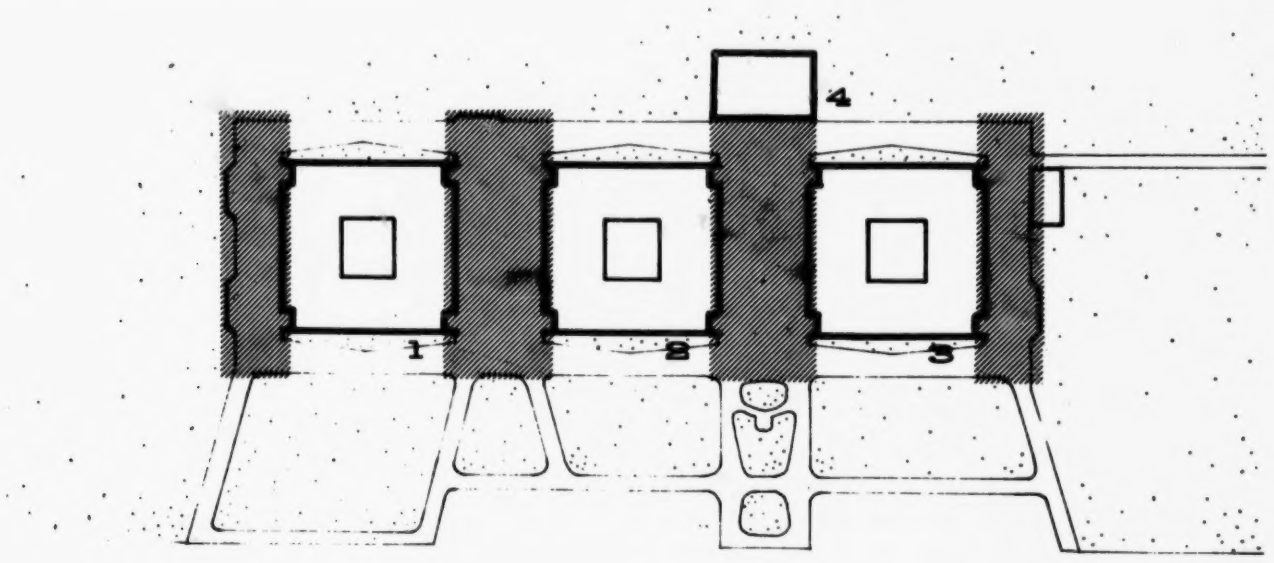
Student theatrical in the all-purpose room.

The quadruplex unit is designed so that it can house different school activities or accommodate different educational programs. The interior walls are not load-bearing - they can be rearranged or eliminated. Operable walls can be substituted for the normal partitions to accommodate a program of varying class sizes.



The administration unit at Montrose adapts the quadruplex to fit different purposes by using an alternate arrangement of interior walls.

The concept of the quadruplex lends flexibility to school planning. A school can be expanded by the addition of quadruplex units as necessary. Units can be arranged in different groupings to adapt to different site conditions. Two other quadruplex schools are now under construction in Laredo. One of these, the Sanchez Elementary School, is made up of three quadruplexes strung out in a straight line.



Sanchez Elementary School

How Montrose Works

When the children were moved from their old school into Montrose in the fall of 1959, they admired the shiny new building but they were reluctant to use it for fear of "getting it dirty." For quite a while, most of the children were reluctant to bring their lunches into the all-purpose room. A typical lunch consists of beans wrapped in a tortilla and half a hard boiled egg. The children insisted upon taking their lunches back to the old school.

The teachers have gradually been successful in bringing the children into the school and teaching them to use it. The shaded play areas have become a favorite place for recreation. The children have come to feel quite at home in their new surroundings, and the teachers have difficulty getting them to leave school now. No such difficulty occurred in the old school.

Cost

The four quadruplexes and the two utility drums at Montrose contain 15,268 square feet of enclosed space. The cost of this space, including all mechanical facilities but not including the site, movable equipment, or the plastic canopies, cost Laredo $151,010, or $9.89 per square foot.

The school contains 16,968 square feet of unenclosed space covered by plastic canopies. Of this, 13,290 square feet is paved with concrete - including the entrances to the quadruplexes. This is all usable educational or recreational area. Excluding the cost of the paving - which would have been put down as walkway even if the canopies had not been added - this 13,290 square feet of space cost $31,147, or $2.34 per square foot.

It is difficult to arrive at a meaningful cost per pupil figure for Montrose because of the wide variation in enrollment at different times of the school year. There are 13 classrooms in the new school, and Montrose Elementary School still technically includes 4 classrooms in a nearby temporary wooden building. These 17 classrooms must handle the school's peak enrollment of 665 students - about 40 students per classroom. The classrooms in the new buildings were designed for 30 students per room. At a design capacity of 390, and a cost of $182,157 (including cost of canopies) Montrose's cost per pupil is $467.

In Sum

Although Montrose is a school designed in part to fit a special climatic and social situation, the basic design devised by the architects is widely applicable.

The quadruplex units can fit different sites, school enrollments, and educational programs.

Canopied play and learning space can be used in wet as well as dry climates.

And the design of almost any school could benefit from an adaptation of Montrose's careful control of its environment.

Montrose - 14

Cost Breakdown

Job set-up layout sign		$ 1,504.00
Utilities, bond insurance, O.H.		5,354.89
Excavation, grading & fill		5,785.00
Concrete & reinforced steel		14,988.66
Waterproofing, dampproofing		675.00
Structural steel		25,100.00
Roof & deck		10,562.00
Masonry		8,891.00
Metal clad panels, wds skylights glass, glazing, labor		13,269.00
Finish hardware		4,750.00
Chalkboard, tackboard, folding stages, and caulking		6,211.00
Corrugated plastics		13,416.52
Insulation		1,690.00
Ceiling suspension system		5,377.00
Painting		3,995.00
Asphalt tile		2,112.00
Carpentry		12,137.82
Millwork		8,600.00
Management fee		1,595.21
Plumbing		
Fixtures	$ 2,655.00	
Waste & vents	2,247.00	
Sewer	255.00	
Water & gas piping	3,620.00	
Evaporative cooler	3,130.00	
Wall furnaces	2,599.00	
Duct works & vents	1,884.00	
Registers & grilles	1,164.00	
Insurance, drayage, travel	1,106.00	18,660.00
Electrical		
Conduit & rough-in wiring material	$ 4,571.00	
Building & service wire	1,810.00	
Panels & main switch	1,908.00	
Fixtures & wiring devices	8,148.00	
Program clocks & bells	1,046.00	17,483.00
Total		$ 182,157.10

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